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EDMONTON DAIRY FARM

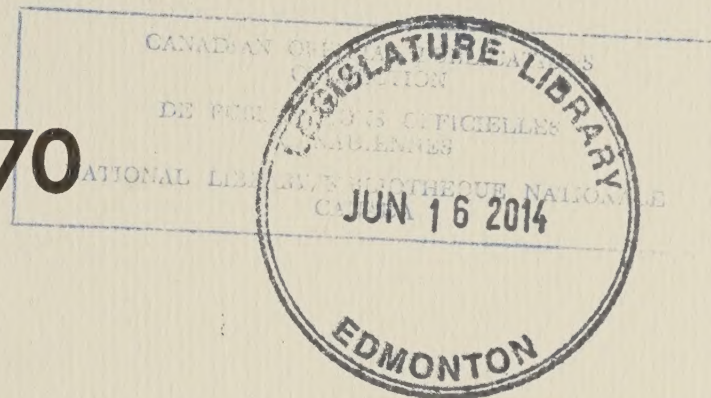
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BUSINESS SUMMARY

1970



A REPORT ON 46 SAMPLE DAIRY FARMS

PRODUCTION ECONOMICS BRANCH
ECONOMICS DIVISION

ALBERTA

DEPARTMENT OF AGRICULTURE

Marketing Sector

MINISTER
HUGH M. HORNER

DEPUTY MINISTER
DR. G.R. PURNELL

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EDMONTON DAIRY FARM

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REPORT ON

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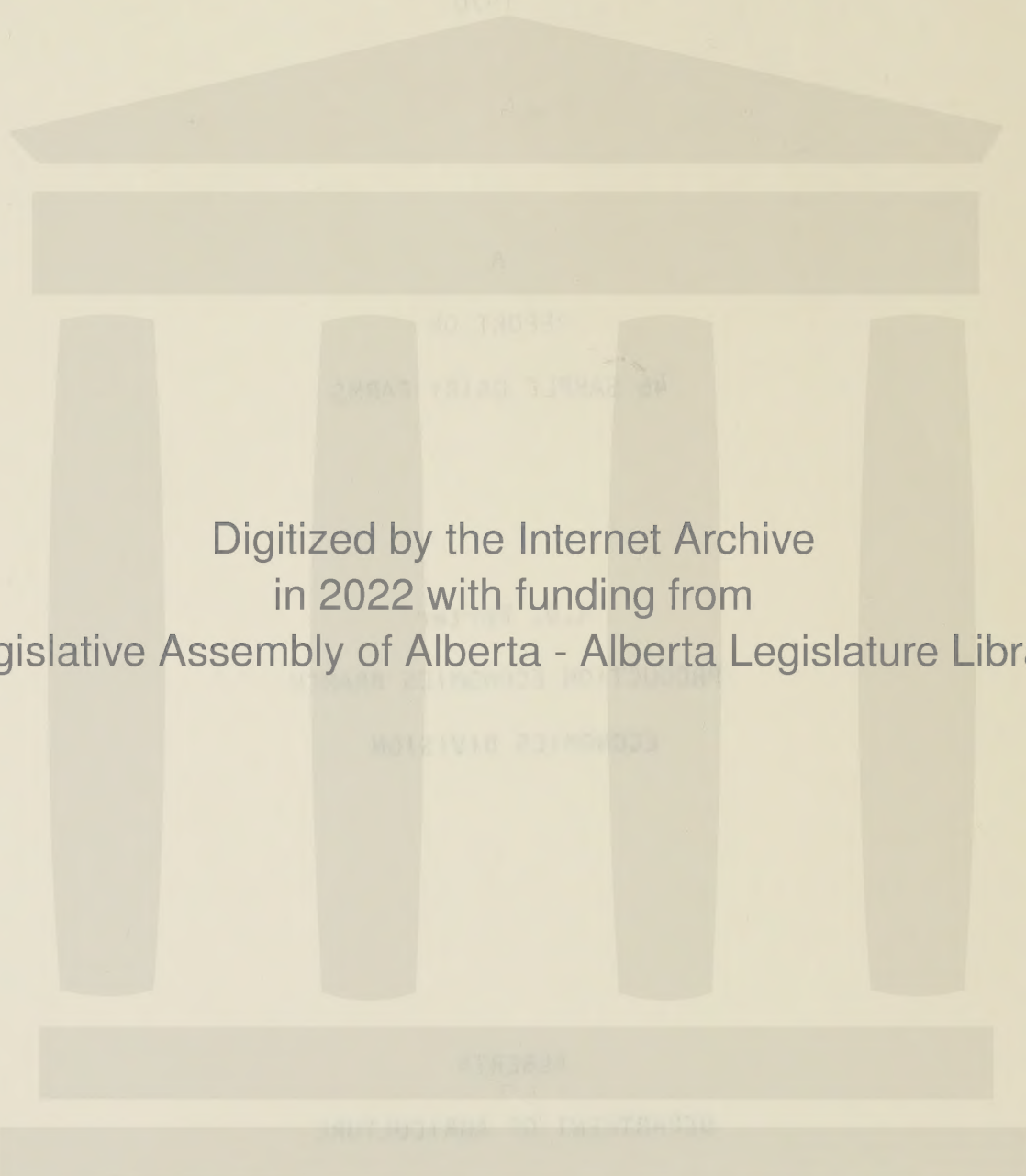
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INTRODUCTION

In 1970, 46 fluid milk shippers out of a total of 414 in the Edmonton milkshed provided records of their businesses for analysis. The farms represented a cross section of the producers based on quota size.

This report contains a summary and analysis of business activities on a group basis in conformation with previous reports. It is intended to supplement computer printouts in the hands of the dairymen with a general comparative analysis, and to provide information to the dairy industry, the Milk Control Board and to Government personnel in the field of farm management.

ACKNOWLEDGEMENTS

Acknowledgement is due to the participating dairymen for their records of business and for their very considerable efforts in adapting their records to the new Alberta Farm Account Book. Thanks are also due to the Milk Control Board for their assistance, and to the other Branches of the Economics Division who helped significantly in gathering the information.

K.D. Porter, Assistant Head,
Production Economics Branch.

DEFINITION OF TERMS

Total Farm - This term includes all enterprises in farm business, and in this report it refers to the income and expenses associated with the total farm operation.

Operating Revenue - Includes cash receipts and the adjustment of crop and livestock inventories less livestock purchased.

Operating Expenses - Are cash expenses plus depreciation, plus an allowance for unpaid family labour exclusive of the operator.

Net Farm Income - Is the difference between Operating Revenue and Operating Expense prior to deducting Capital interest expense and an interest return up to a combined value of 7% of the current equity in the farm.

Labour Income - Is the residual to the operator after deducting the interest on investment.

Labour Earnings - Is the addition of labour income and the value of home-consumed produce, and is the amount forthcoming to the farm operator for his labour and management for the year.

Dairy Enterprise - The Dairy Enterprise, for the purpose of business analysis, is an operating unit in itself which may draw upon other enterprises of the farm for such resources as feed and labour.

Herd Credit - Is the increase or decrease in the value of the dairy herd through sales, purchases, births, natural growth and dairy livestock losses during the year.

Milk Costs Per Hundredweight - This refers to the analysis of costs of production of milk sold to the fluid milk distributing plants.

Return to Management and Profit - Or Return to the Operator's Management and Risk, is the dollar value remaining to the operator after including his labour and interest at 7% on capital as costs of operation.

Value of Production From Dairy - Is the receipts from the sale and personal use of dairy products plus the value of inventory change in feed and dairy cattle less purchase of dairy livestock.

DEFINITION OF TERMS

Total Variable Costs - Are short-term costs which vary relative to output.

Fixed Costs - Consist of depreciation, interest on investment and such costs as utilities, insurance and taxes.

Total Production Cost - Is the sum of all variable costs, labour and fixed costs.

Unpaid Labour - Consists of the operator's labour and any unpaid labour contributed by the family.

Capital Turnover - Is the number of years required for the value of production or operating revenue to equal the average investment for the year.

OUTLINE OF THE STUDY

The dairy study deals with the economics of fluid milk production at the producer level in three general Alberta areas--Edmonton, Calgary and Lethbridge. A 10.5% sample of the 724 Alberta shippers submitted business information for the calendar year of 1970. In this year, the Alberta Farm Account Book was introduced for general use, the dairy farmers giving it the first trial. Assistance was provided in entering data so as to best facilitate computerization. Farmers' records from these books accounted for most of the data for analysis.

Objectives

The purpose of the study is to provide a continuing account of the economic conditions in the production of fluid milk in Alberta for the Milk Control Board and the milk industry as a whole, and to provide the participating dairy farmers with personal business analyses for management purposes.

Characteristics of the Study

The study was designed to be as representative as possible through selection by area and by quota size, the dairy enterprise being the main source of income on all farms. Crop enterprises are carried on in nearly all the dairy farms and certain dairy farmers have beef enterprises besides. The Alberta Farm Account Book was constructed to accommodate all such enterprises and, in the future, it is expected that analyses of each may be requested by farmers.

Report Procedure

Farms were assembled according to their market areas and separate area reports have been made. Basic tables on Income and Expense respecting the Total Farm and Dairy Enterprise were first constructed. Management levels were determined, followed by auxiliary tables of feed and labour use. A development of management factors and their effect on the dairy enterprise was added. Comparative tables for farms of low, medium and high productivity were constructed and a consolidated statement made for all Alberta dairy enterprises.

FARM INCOME AND EXPENSES

The summary of the total farm business is a useful preliminary to the dairy enterprise analysis because other enterprises usually of a complementary nature may either add to or detract from the success of the farm operation. Table 1 shows Comparative Income Statements in terms of group averages for 1968-69 and 1970.

Receipts - Milk sales in 1970 accounted for \$23,974.00 of income per farm. Along with dairy cattle sales, they together amounted to 94% of total cash receipts. Other livestock, crop sales and miscellaneous receipts were relatively minor and provided approximately 2% each of total cash receipts. This production pattern is somewhat different from that of Calgary and Lethbridge where revenue from other livestock and crop sales is substantial.

Inventory Change - Additions to inventory in both crops and livestock influenced the revenue picture. While dairy livestock purchases were greater in 1970, the resulting net inventory change increased the Operating Revenue to \$31,721.00.

Expenses - Feed purchases are supplementary to home grown supplies and, in the Edmonton area, usually are lower than in the southern milksheds. This 1970 expense was less than in 1968-69. General Dairy Expense and Wages Paid show the only major increases in cash expenses in 1970. Operating payments, influenced mainly by the foregoing changes, remained at the same level in both years. The value of unpaid family labour decreased on the average in 1970 and helped to reduce Total Operating Expenses to \$18,174.00. The Net Farm Income in 1970 rose to \$13,547.00 largely because of the higher operating revenue.

Labour Earnings - In 1970, new acquisitions of machinery, farm building construction and higher herd valuations increased the farm investment. Farmers' revisions of the market value of some capital assets also played a part. An arbitrary increase of 1% in the allowance for an investment return on land and buildings was used in the 1970 analysis and added \$784.00 to that item. Interest expense of \$1,006.00 was paid out by the farmer on capital loans and is included in the Interest on Capital figure in the table. The average operator's Labour Earnings, after the deduction of interest and the addition of perquisites, rose to \$4,083.00 in 1970.

Table 1 INCOME STATEMENT FOR THE TOTAL FARM OPERATION
January 1, 1970 to December 31, 1970

Edmonton Whole Milk Farms	Group Average 1968-69	Group Average 1970	Your Farm		Group Average 1968-69	Group Average 1970	Your Farm
Number of farms ^{a/}	64	46			64	46	
<u>EXPENSES</u>	<u>b/</u>			<u>RECEIPTS</u>			
Feed bought for LS	\$ 3,253	\$ 2,157	\$	Gross milk sales	\$21,783	\$23,974	\$
Auto expenses	386	297		Dairy cattle sales	3,148	3,428	
Tractor expenses	660	731		Other livestock	958	548	
Truck expenses	435	512		Crop sales	603	650	
Gen. farm exp. (seed, fert., twine, etc.)	3,144	2,859		Misc. receipts	439	600	
Gen. dairy exp. (vet., milkhhouse supplies, etc.)	829	1,584		<u>TOTAL CASH RECEIPTS</u>	<u>26,931</u>	<u>29,200</u>	
Annual joint exp. (ins., phone, taxes, elec.)	1,409	1,207		Change in Crop Inventory	506	2,442	
Wages paid with board	1,732	2,428		Change in LS Inventory	521	1,400	
Hauling & fees off milk cheque	1,198	1,278		Deduct:			
<u>OPERATING PAYMENTS</u>	<u>13,046</u>	<u>13,053</u>		LS Purchases	941	1,321	
Add:				Net Inventory Change	86	2,521	
Depreciation on bldgs. & equipment	4,427	4,340		<u>OPERATING REVENUE</u>	<u>27,017</u>	<u>31,721</u>	
Unpaid family labour (not incl. operator)	1,574	781					
<u>TOTAL OPERATING EXPENSES</u>	<u>19,047</u>	<u>18,174</u>					
Net Farm Income	7,970	13,547					

The Net Farm Income for the groups of farms above represents the Average Net Income per farm and results from subtracting Total Operating Expenses from the Operating Revenue. The Net Farm Income is further modified by deducting interest on Capital investment at a rate of 7% and farm produce used on the farm (perquisites) to arrive at the returns from the Total Farm Business. In 1970, only the business portion of the farm home was capitalized in the farm business so the personal portion does not enter into perquisites. The final measure is known as the operator's LABOUR EARNINGS which is the return to the operator for his labour and management and is shown below.

Deduct:			
Int. on capital	\$ 7,169	\$ 9,621	\$
LABOUR INCOME	801	3,926	
Add: Perquisites	902	157	
<u>LABOUR EARNINGS</u>	<u>\$ 1,703</u>	<u>\$ 4,083</u>	<u>\$</u>

^{a/} Previous year's figures included for comparison.

^{b/} All figures have been rounded to the nearest dollar.

EDMONTON DAIRY ENTERPRISE ANALYSIS

Table 2 provides comparative group averages for the Edmonton dairy enterprises in the years 1968-69 and 1970.^{1/} The receipts and expenses concern the production of dairy products only. Other enterprises such as raising dairy steers for sale as beef were excluded. Herd credit, which is the net change in the value of the herd during the year, showed an average increase and was included as a receipt. The various expenses were assembled into four main categories, the operator's labour being included in order to be able to arrive at a net return to the operator's management.

Receipts from the sale of milk constituted 85% of the total receipts from the enterprise in 1970 and were up by \$2,029 from 1968-69. The herd credit accounted for most of the additional value. Miscellaneous receipts and home-used milk were minor items.

Costs rose significantly in only one category--overhead, and accounted for most of the change in total costs per farm. Proportionate costs were Feed - 38%, Labour - 21%, Overhead - 23% and Other Costs - 18%. The increase in receipts however, offset the added cost, and resulted in a slightly higher net return to management in 1970.

Milk Costs Per Hundredweight

In this section of Table 2, receipts other than those resulting from the sale of milk to whole milk plants were eliminated, and costs were reduced by the amount of the herd credit in order to arrive at a net return per hundredweight of sales to plants.

Overhead again was responsible for the increase in cost. Feed cost per hundredweight decreased to \$2.17. The average price of \$5.69 per hundredweight was up \$0.20, reflecting the higher butterfat content. The effect of this higher price was partly offset by a \$0.15 increase in net cost resulting in a return to the operator's management of \$0.79 per hundredweight.

^{1/} A table consolidating Edmonton, Calgary and Lethbridge is shown on page 16.

Table 2

DAIRY ENTERPRISE COST ANALYSIS
January 1, 1970 to December 31, 1970

Edmonton Whole Milk Farms	Group Average 1968-69	Group Average 1970	Your Farm
Number of farms	64	46	
<u>Dairy Receipts Per Farm</u>			
Value of milk sales per farm	\$21,945	\$23,974	\$
Value of milk used in house per farm	209	118	
Value of credits to dairy herd per farm ^{a/}	3,449	3,756	
Value of miscellaneous dairy income		223	
Total Receipts	25,603	28,071	
<u>Dairy Costs Per Farm</u>			
Feed cost at farm market value (including pasture)	9,580	9,227	
Labour cost ^{b/}	5,118	5,246	
Overhead cost (depreciation and interest)	3,661	5,758	
Other costs (marketing, milkhouse supplies, etc.)	4,277	4,312	
Total Costs	22,636	24,543	
Net amount left for profit and management after charging custom rate per hour for dairy labour	2,967	3,528	
<u>Milk Costs Per Hundredweight Basis</u>			
Feed (including all purchased and home grown and pasture charge)	2.38	2.17	
Labour (dairy share of total farm labour)	1.27	1.24	
Overhead cost (depreciation and interest)	0.90	1.36	
Other costs (marketing, milkhouse supplies, etc.)	1.06	1.02	
Total gross cost per cwt. milk	5.61	5.79	
Credit from herd increase (due to herd growth)	0.86	0.89	
Total net costs per cwt. milk	4.75	4.90	
Average price received per cwt. for all milk sold	5.49	5.69	
Returns to management and profit per cwt. of milk	0.74	0.79	
Net cost per lb. butterfat	1.37	1.40	
Receipts per lb. butterfat	1.59	1.62	
Butterfat test of milk	3.46%	3.51%	

^{a/} Credits to dairy herd are value of herd at the end of the year plus sales of cattle, plus cattle butchered, less value of herd at the beginning of the year and less purchase of cattle. They also include milk fed to calves and A.I. rebates.

^{b/} Represents wages paid for single and married dairy labour. Where no hired help was employed, operator and family labour was entered at the average rate for hired labour.

MANAGEMENT

Management is concerned with organizing, planning, directing and supervising a business. Dairy farmers carry out these functions and, in many cases, add their own labour. Over the long term, their decisions are made in reference to two conditions--size and intensity. The wide range in size of Alberta dairy herds has persisted for many years. This has not been so much due to entry of small operators as to the decision of existing operators as to how much responsibility they want to assume as managers. Therefore, no individual operation can be selected out of all farms to be a model for all operations.^{1/}

Table 3 has been set up to show average levels in the management factors influencing income in 1968-69 and 1970. The unit factors, per cow, per D.A.U., per hour, per pound and per hundredweight, which measure intensity, are perhaps of more direct interest in individual comparisons for small and intermediate operators, than aggregate factors.

Livestock - Fluid milk sales increased by 21,496 pounds per farm in 1970. The butterfat test increased .5 points on the average. A slight increase in feed per dairy animal unit occurred.

Crops - Yields in all grain crops and roughage were higher in 1970.

Labour - The level of the operating revenue for the total farm rose in 1970 and in spite of the increase in man equivalents, returned a higher revenue per man. The cost of dairy labour per hour increased but the hours required per hundredweight of milk decreased, resulting in a higher return per hundredweight to all dairy labour and management.

Capital - A slight decrease in the efficiency of Capital use occurred in 1970, as shown by the slower turnover.

Size of Business - A decrease in average farm acreage occurred in 1970. Total value of Capital assets increased. The producing herd size increased by two cows per farm.

^{1/} Comparisons by size, page 15.

Table 3

MANAGEMENT FACTORS AFFECTING INCOME
January 1, 1970 to December 31, 1970

Edmonton Whole Milk Farms		Group Average 1968-69	Group Average 1970	Your Farm
Number of farms		64	46	
<u>Livestock</u>				
Milk production per cow (including milk fed to calves and for home use)	(lbs.)	10,892	10,793	
Fluid milk sales per farm	(lbs.)	399,571	421,067	
Butterfat per cow	(lbs.)	377	378	
Butterfat test of milk	(%)	3.46	3.51	
Grain & supplement fed per dairy animal unit	(lbs.)	3,091	3,465	
Roughage per dairy animal unit	(tons)	3.9	4.3	
Returns per \$100 feed fed	(\$)	267	304	
<u>Crops</u>				
Yield per acre:				
Barley	(bus.)	40	51	
Oats	(bus.)	58	69	
Wheat	(bus.)	26	39	
Roughage	(tons)	1.5	2.1	
Other Grain	(cwt.)		31.8	
<u>Labour</u>				
Man equivalent per farm	(no.)	1.7	1.84	
Operating revenue per man	(\$)	14,438	17,236	
Cost of dairy labour per man hour ^{a/}	(\$)	1.48	1.52	
Returns to dairy management and labour per man hour	(\$)	2.33	2.58	
Labour per pound of butterfat produced	(hrs.)	0.25	0.22	
Hours of labour per 100 pounds of milk produced	(hrs.)	0.83	0.78	
Hours per cow equivalent (herd basis)	(hrs.)	62	60	
<u>Capital</u>				
Operator's revenue per \$1,000 capital invested	(\$)	243	226	
Years for operating revenue to equal capital	(yrs.)	4.1	4.4	
<u>Size of Business</u>				
Number of acres owned and rented	(acs.)	449	393	
Number of acres owned	(acs.)	320	303	
Number of cultivated acres (including summerfallow)	(acs.)	257	336	
Capital invested (owned farms)	(\$)	111,255	140,468	
Number of milk cows (including dry cows)	(no.)	38.1	40.0	
Total dairy animal units (in terms of cow equiv. i.e. one cow equals 1.5 heifers or 3 calves)	(no.)	56.1	56.6	
Number of milk cows as percent of total herd in cow equivalent	(%)	68.0	70.7	

^{a/} The average rate for all labour charged to dairy chores. This consisted of single and married wages with board. The operator's labour was charged at the going married labour rate.

FEED CONSUMPTION AND FEED VALUES

The table below provides some comparative measures between purchased and home grown feed on Edmonton study farms for the past three years. The cost of purchased roughage per farm, in 1970, decreased from 1968-69. More roughage was supplied from the home farm. While the value per ton purchased dropped by \$5.11, the lower purchases rendered the change in total roughage cost almost negligible. The feed was composed of alfalfa - 51%, silage - 36%, greenfeed - 8% and feed straw and native hay - 5%. Higher silage consumption is notable in contrast with Calgary and Lethbridge study farms where the respective percentages were 21% and 6%.

The consumption of grain, complete feed and concentrate per farm in 1970 was only 5,000 pounds greater than in 1968-69. The value per pound of both purchased and home grown supplies decreased. This feed, by weight, was composed of oats - 44%, barley - 41%, complete feed and supplement - 9% and wheat - 6%. The general proportion of fed roughage to grain and concentrates was 2.5 pounds to 1 pound.

Table 4 DAIRY LIVESTOCK FEED CONSUMPTION AND FEED VALUES

		Group Average 1967-68	Group Average 1968-69	Group Average 1970
Edmonton Whole Milk Farms				
Number of farms		26	64	46
<u>Purchased Roughage Fed</u>				
Average value per farm	(\$)	1,180	1,071	777.15
Average tons per farm	(tons)	46.2	37.2	32.78
Value per ton	(\$)	25.54	28.82	23.71
<u>Home Grown Roughage Fed</u>				
Average value per farm	(\$)	3,313	3,905*	4,254
Average tons per farm	(tons)	161.4	181.4*	209.1
Value per ton	(\$)	20.53	21.52*	21.64
<u>Purchased Grain and Other Concentrates Fed</u>				
Average value per farm	(\$)	828	1,474	1,209
Average pounds per farm	(lbs.)	32,157	68,604	64,969
Value per pound	(¢)	2.57	2.15	1.86
<u>Home Grown Grains Fed</u>				
Average value per farm	(\$)	2,715	2,376	2,077
Average pounds per farm	(lbs.)	141,249	122,592	131,245
Value per pound	(¢)	1.92	1.94	1.58

* Revision 1968-69

LABOUR

The source of labour on dairy farms during recent years seems to have changed very little. In the main, the operator and the family supply a considerable amount of labour in the form of a father-son or brother partnership, with the assistance of teenage or younger children and the dairyman's wife. Quite often the partners draw wages, or else a son is paid an agreed-upon wage. Other members are paid or not paid, depending on the circumstances while they contribute intermittent or part-time assistance. Casual labour is arranged with neighbors on either a trading arrangement or straight wages. On the larger dairy farms the operators try to keep at least one or more permanent skilled hired workers. Housing accommodations and living conditions for married workers are generally quite good.

A distribution of labour in the Edmonton study group of 46 dairy farms shows the type of labour and wages paid including board which was recorded in 1970. These wages represent payment for work of any nature which may occur on the farm.

LABOUR RATES

	Hired		Hired		Total	
	Skilled	Labour	Family and	Casual	Months	Hired
	Months	Value	Months	Value		Value
Total	286	\$95,894	69	\$15,769	355	\$111,663
Per Month		336		227		315

For the purpose of attributing a value to all labour on the farm, the farm operators were asked to value their labour at going rates. This was undertaken in order to show its significance in the analysis where returns are attributed to the operator's labour as well as to his equity and his management of the business. In the Edmonton study the operator's labour contributions are shown below. Though unpaid family labour did not receive formal wages it was significant in the labour picture. It was evaluated with respect to age and the time involved. The summary is included.

	<u>OPERATOR LABOUR</u>	<u>UNPAID FAMILY LABOUR</u>
Months	542	132.5
Total Value	\$198,377	\$35,932
Value Per Month	366	271

RETURN TO UNPAID LABOUR, MANAGEMENT AND INVESTMENT

Table 7^{1/} provides one of the best means of measuring success between farms by utilizing as a basis the stage where returns apply to the combined items of unpaid labour, management and investment. These components are highly variable between farms, and when the Returns to Management is specified as the single outcome, the importance of the other items is sometimes overlooked. Comparisons, for this purpose, can be made several steps before either Labour Earnings or Return to Management are stated, by using the residual at that point as the return to the business.

In Table 5, this residual was expressed in the return per cow, and averaged \$251.00 per cow for the seventy-six farms in 1970. The farms were arranged in two groups--above and below that level. Forty-three were above, thirty-three were below. The accompanying table shows general similarities and some significant differences in the costs and returns for the two groups.

The table shows both groups chosen on this basis as being close to equal size, in the range of \$32,000 Value of Production, 500,000 pounds of milk production, 11,000 pounds of milk per cow, 45.5 milking cows and \$59,000 of investment in the Dairy Operation. However, differences in costs appear and the results show up as higher levels of returns in all measurements.

Efficiency is often best shown on a unit basis. In the table, a hundredweight of milk produced is the unit and is related to the total value of production, including livestock output as well as milk. The figures on costs per hundredweight bring out the reasons for the better results for the first group. Every item of expense is lower in this group. Reductions in costs appear in feed - \$0.55, other variable expenses - \$0.28, labour - \$0.07, fixed costs - \$0.26, giving a total cost reduction of \$1.16 per hundredweight.

Considering the relatively large number of farms in each group and the nearly equal size of business, it would appear that these per unit comparisons are good indicators of the expenses dairymen might want to watch. While feed

^{1/} Alternative tables, Appendix pages 1 and 2.

Table 5

RESOURCE COSTS RELATED TO RETURNS TO
UNPAID LABOUR, MANAGEMENT AND INVESTMENT
(76 Dairy Enterprises)

		Return to Unpaid Labour, Management & Investment Per Cow	
		<u>Over \$251</u>	<u>Under \$251</u>
Number of Farms		43	33
Milk Sales	(\$)	27,809	28,119
Total Value of Production	(\$)	32,668	32,105
Total Cost of Production	(\$)	26,324	31,587
Return to Unpaid Labour, Mgmt. & Investment	(\$)	14,215	7,957
Return to Management & Risk	(\$)	6,344	518
Receipts Per Cwt. Milk Produced	(\$)	6.41	6.43
Feed Cost Per Cwt.	(\$)	1.92	2.47
Other Variables Per Cwt.	(\$)	0.82	1.10
Labour Per Cwt.	(\$)	1.10	1.17
Fixed Cost Per Cwt.	(\$)	1.34	1.60
Total Production Costs	(\$)	5.18	6.34
Return to Unpaid Labour, Mgmt. & Invest.	(\$)	2.79	1.59
Return to Unpaid Labour & Management	(\$)	1.99	0.76
Return to Operator's Labour & Management	(\$)	1.87	0.68
Return to Management & Risk	(\$)	1.23	0.09
Number of Milk Cows	(no.)	45.0	46.3
Total Milk Production	(lbs.)	509,631	499,061
Production Per Cow	(lbs.)	11,284	10,782
Total Investment	(\$)	58,466	59,235
Capital Turnover	(yrs.)	1.79	1.85

has the greatest bearing on costs, the table shows that each of the others must be given attention by the operator if he wishes to achieve the largest returns from the dairy enterprise. Though lower feed costs accounted for the greatest single reduction in cost, the table indicates that each of the five played an important part in contributing to higher average returns per hundredweight.

FACTOR EFFICIENCY AND RESOURCE USE

On page 7 there were a number of management factors listed which represent averages in the levels of resource use and output on the sample dairy farms in 1970. Each of the participating dairymen in his report has his comparable figures beside them to which he may relate his own performance. There are ranges above and below average performance, however, that should be given analysis. This may be done by grouping the farms relative to chosen management factors such as those on the following page.

1. Size may be distinguished physically or financially in respect to either inputs or outputs. Size has been found to have a bearing on success. A large efficient farm may be expected to produce a larger net revenue than a small efficient farm. In regard to a dairy enterprise, the number of cows is a good index of size.

2. Output per cow is a measure of efficiency of herd productivity which should influence the profitability of the enterprise.

3. Sales of milk per \$1,000 of dairy investment shows how well capital is being used and also should be related positively to returns to the operator.

4. Milk production per man equivalent is a measure of labour efficiency.

5. Gross returns over feed fed per cow is a measure of efficiency in the use of feed and normally ought to cause an increase in net returns as the margin increases.

The measurements above are called Efficiency Factors. There are others, but these five are good indicators of success. They have been selected for use in this study.

First, the average levels of performance in the factors was found for the total group of 76 dairy enterprises. The individual enterprises were then divided into above average and below average in reference to the factors. Farms with performance levels which were exactly average were placed alternately in above and below average classifications.

The factor analysis was carried a step further to ascertain that success in an increasing number of factors was, in fact, accompanied by higher net returns.

Table 7 below relates returns to factor performance.

Table 7	<u>FACTOR EFFICIENCY AND RETURNS</u> <u>TO THE OPERATOR</u>			
	(76 Alberta Dairy Enterprises)			
<u>Number of Efficiency Factors Above Average</u>	<u>Number of Enterprises</u>	<u>Returns to Unpaid Labour & Management</u>	<u>Operator's Labour Earnings</u>	<u>Returns to Operator's Mgm't & Risk</u>
5	4	\$23,558	\$23,521	\$20,369
4	16	9,002	8,783	5,965
3	25	7,476	6,959	3,571
2	16	6,485	5,430	2,613
1	10	2,262	1,944	-1,153
0	5	1,895	1,590	-1,315

Three stages in returns to the operator were calculated for the 76 dairy enterprises and are set up in the columns as they occurred relative to the five factor performance. Success in the number of factors above average ranges from high to low in the table with the corresponding returns on the same line.

Returns to unpaid labour and management is the net return to the operator and unpaid family labour, Labour Earnings is the return to the operator's labour and management. Returns to the operator's management and risk is the net to the operator after charging his own labour as a cost of operation.

It can be seen that returns in each column range from high to low, corresponding with the standing in efficiency factors. Thus, in regard to the dairy enterprises forming the study, the operators who were above average in an increasing number of efficiency factors received increasingly higher net returns from their businesses.

The average factor levels were:

1. The number of cows in the herd 45.6 (cows)
2. Sales of milk per cow 10,740 (lbs.)
3. Sales of milk per \$1,000 of dairy investment . . . 470 (\$)
4. Milk produced per man equivalent 415,381 (lbs.)
5. Gross returns over feed cost per cow 472 (\$)

Table 6

FIVE-FACTOR EFFICIENCY OUTCOMES
(76 Alberta Dairy Enterprises)

Efficiency Factors	Number of Factors Above Average					
	0	1	2	3	4	5
Number of Enterprises	5	10	16	25	16	4
Number of Cows	28	36	40	40	56	114
Milk Sales Per Cow ^{1/} (lbs.)	8,808	8,844	10,028	10,439	12,091	12,023
Milk Sales Per \$1000 Investment ^{1/} (\$)	414	351	410	470	522	658
Milk Produced Per Man Equivalent (lbs.)	280,586	335,472	342,502	387,959	506,561	578,237
Gross Returns Over Feed Cost Per Cow (\$)	357	376	431	482	520	524

^{1/} To fluid milk plants.

Table 6 shows the number of factors above average over each of the five columns, with the highest degree of efficiency related to 5. The number of records associated with each follows, and the factor data is arranged below.

Inspection of the table reveals a clear trend in efficiency in all the items of productivity as one reads from left to right. There were only five instances in the zero class and only four in the class above average in all five factors. The largest group of 25 enterprises was above average in three factors. The table shows that high performance in one aspect of production is not enough and that such performance should be attempted for all factors, in as far as possible, in order to make the best use of resources.

MILK PRODUCTION	LOW		MEDIUM		HIGH	
	(to 334,999 lbs.)		(335,000 to 447,999 lbs.)		(Over 448,000 lbs.)	
Number of Farms	15		15		16	
<u>Enterprise Receipts</u>						
Livestock Receipts		1830.42		3209.73		4752.54
Livestock Transferred to Other Enterprises		367.33		197.33		445.63
Milk Receipts		15330.92		21892.43		34026.91
Subsidies and Other Receipts		192.93		192.27		281.50
Livestock and Produce Used		105.09		148.47		132.01
Less Livestock Purchases		607.87		835.67		1925.06
Less Livestock Transferred From Other Enterprises						
Adjustment for Inventory Change		996.33		374.87		2306.13
Value of Production From Dairy		18215.16		25179.43		40019.65
<u>Enterprise Costs</u>						
Grain	1198.99 cwt.	1571.57	1595.66 cwt.	2109.81	2537.12 cwt.	3315.69
Supplement	82.21 cwt.	277.09	18.39 cwt.	323.93	56.26 cwt.	709.23
Complete Feed	33.60 cwt.	84.69	125.40 cwt.	250.00	184.74 cwt.	484.50
Roughage	120.63 tons	2694.44	132.33 tons	2949.06	203.94 tons	4502.76
Silage	21.11 tons	424.85	79.72 tons	1657.06	153.13 tons	3414.13
Feed Straw	4.47 tons	43.19	3.05 tons	32.87	1.50 tons	11.25
Pasture	129.70 AUM	536.25	169.93 AUM	602.16	225.75 AUM	771.92
Mineral, Salt, Etc.		139.91		116.60		367.13
Total Feed		5771.99		8041.49		13576.59
Bedding Straw		200.65		259.33		430.59
Veterinary and Medicine		147.69		196.04		490.07
Other Direct Variable Costs		1315.98		1757.58		2555.14
Allocated Variable Costs		904.74		1024.27		1663.74
Total Variable Costs (Excluding Labour)		8341.05		11278.70		18716.12
Hired Labour	658.07 hrs.	522.86	723.67 hrs.	960.33	1716.25 hrs.	3279.50
Family Labour	333.27 hrs.	348.00	715.67 hrs.	728.97	432.63 hrs.	458.56
Operator Labour	1920.93 hrs.	3297.87	1952.93 hrs.	3196.13	1708.50 hrs.	2857.56
Total Labour	2912.27 hrs.	4168.72	3392.27 hrs.	4885.43	3857.38 hrs.	6595.63
Utilities and Overhead Costs		466.59		558.18		852.13
Depreciation Charges		1172.60		1792.79		2729.00
Interest--Buildings and Site (7%)		737.60		1000.21		1558.07
Interest--Machinery and Equipment (7%)		412.27		618.29		859.45
Interest--Feed and Supplies (7%)		13.80		27.16		52.01
Interest--Livestock and Quota (7%)		1369.02		1748.29		3018.78
Total Production Cost		16681.64		21909.05		34381.16
Return Over Variable Costs		9874.11		13900.73		21303.53
Return to Unpaid Labour, Investment and Management		7712.06		10589.42		14442.91

Difference in sizes of dairy enterprises are important to the farmers who operate within them. The table above was arranged to assist dairymen to associate their particular size of operation with one of the three above and to be enabled to examine their own in closer reference than could be possible with an all-farms average. The basis of grouping was by volume of milk production, the total number of enterprises being arranged in order of size and divided into thirds. This procedure was also followed in 1968-69 and thus, some comparability is also possible with that year.

Table 9

REGIONAL ENTERPRISE COST COMPARISONS

	Edmonton Group Average 1970	Calgary Group Average 1970	Lethbridge Group Average 1970	All Areas Group Average 1970
Number of farms	46	23	7	76
<u>Dairy Receipts Per Farm</u>				
Value of milk sales	\$23,974	\$32,018	\$40,401	\$27,921
Value of milk used in house	118	106	168	119
Value of credit to dairy herd	3,756	4,662	5,839	4,222
Value of miscellaneous dairy income	223	87	0	161
Total Receipts	\$28,071	\$36,873	\$46,408	\$32,423
<u>Dairy Costs Per Farm</u>				
Feed cost at farm market value (including pasture)	\$ 9,227	\$12,825	\$15,433	\$10,887
Labour cost	5,246	6,167	7,157	5,701
Depreciation and interest cost	5,758	7,100	7,349	6,311
Other Costs	4,312	8,153	6,873	5,710
Total Costs	\$24,543	\$34,245	\$36,812	\$28,609
Return to Management	3,528	2,628	9,596	3,814
<u>Milk Costs Per Hundredweight Basis</u>				
Feed (purchased, home grown and pasture charge)	\$ 2.17	\$ 2.31	\$ 2.07	\$ 2.21
Labour (dairy share)	1.24	1.11	0.96	1.15
Depreciation and interest	1.36	1.28	0.98	1.28
Other costs	1.02	1.47	0.92	1.16
Gross cost per cwt. of milk	\$ 5.79	\$ 6.17	\$ 4.93	\$ 5.80
Less credit from herd growth	0.89	0.84	0.78	0.86
Net cost per cwt. of milk	\$ 4.90	\$ 5.33	\$ 4.15	\$ 4.94
Average price received per cwt. for all milk sold	\$ 5.69	\$ 5.76	\$ 5.35	\$ 5.69
Return to management	0.79	0.43	1.20	0.75
Net cost per lb. butterfat	\$ 1.40	\$ 1.53	\$ 1.19	\$ 1.41
Receipts per lb. butterfat	1.62	1.65	1.53	1.63
Butterfat test of milk	3.51%	3.49%	3.49%	3.50%

The table above reproduces the Edmonton Dairy Enterprise Cost Analysis from page 5, along with the corresponding tables from the Calgary and Lethbridge reports. A consolidation of these which include all study farms is shown in the right-hand column.

A P P E N D I X

Table 1 CHARACTERISTICS OF DAIRY ENTERPRISES CLASSIFIED BY
FEED COSTS PER COW AND INVESTMENT PER COW

1970

		Alberta Cost of Feed ^{1/} Per Cow		Alberta Investment ^{2/} Per Cow	
		Over \$238	Under \$238	Over \$1,287	Under \$1,287
Number of Farms		35	41	39	37
1. Milk Sales	(\$)	27,196	28,623	25,704	30,271
2. Total Value of Production	(\$)	31,517	33,173	30,264	34,594
3. Total Cost of Production	(\$)	30,909	26,591	28,129	29,096
4. Return to Op. Labour & Mgmt.	(\$)	3,873	9,484	5,304	8,449
5. Return to Management & Risk	(\$)	608	6,582	2,135	5,498
6. Receipts/Cwt. Milk Produced	(\$)	6.50	6.33	6.55	6.29
7. Feed Cost Per Cwt.	(\$)	2.56	1.81	2.28	2.03
8. Other Variables Per Cwt.	(\$)	1.06	0.84	0.96	0.92
9. Labour Per Cwt.	(\$)	1.17	1.10	1.19	1.08
10. Fixed Cost Per Cwt.	(\$)	1.59	1.33	1.66	1.28
11. Total Production Costs	(\$)	6.38	5.08	6.09	5.31
Returns to:					
12. Unpaid Labour, Mgmt. & Invest.	(\$)	1.74	2.69	2.21	2.31
13. Unpaid Labour & Management	(\$)	0.90	1.90	1.25	1.61
14. Operator's Labour & Management	(\$)	0.80	1.81	1.15	1.52
15. Management & Risk	(\$)	0.12	1.25	0.46	0.98
16. Number of Cows	(no.)	44.8	46.2	41.6	49.6
17. Total Milk Production	(lbs.)	484,635	523,882	461,982	550,330
18. Production Per Cow	(lbs.)	10,825	11,324	11,097	11,094
19. Dairy Investment	(\$)	58,499	59,075	63,886	53,589
20. Capital Turnover	(yrs.)	1.86	1.78	2.11	1.55

^{1/} Feed cost per cow, above or below the average of \$238.00, is the main determinant in the results listed in columns 1 and 2.

^{2/} Dairy investment, above or below the average of \$1,287.00 per cow, is the controlling factor in the results obtained in the third and fourth columns.

Table 2 CHARACTERISTICS OF DAIRY ENTERPRISES CLASSIFIED BY
THE GROSS VALUE OF PRODUCTION PER COW AND THE NUMBER OF HOURS OF LABOUR
PER HUNDREDWEIGHT OF MILK

1970

		Alberta Gross Value ^{1/} of Production Per Cow		Alberta Hours of Labour ^{2/}	
		Over \$710	Under \$710	Over .72 Hrs./Cwt.	Under .72 Hrs./Cwt.
Number of Farms		38	38	39	37
1. Milk Sales	(\$)	33,960	21,928	21,195	35,056
2. Total Value of Production	(\$)	39,719	25,127	25,187	40,050
3. Total Cost of Production	(\$)	33,754	23,464	23,184	34,328
4. Return to Op. Labour & Mgmt.	(\$)	9,165	4,954	5,251	8,596
5. Return to Management & Risk	(\$)	5,965	1,663	2,003	5,722
6. Receipts Per Cwt. Milk Produced	(\$)	6.46	6.36	6.56	6.33
7. Feed Cost Per Cwt.	(\$)	2.08	2.27	2.16	2.15
8. Other Variables Per Cwt.	(\$)	0.93	0.95	0.95	0.92
9. Labour Per Cwt.	(\$)	1.08	1.20	(.97 hr) 1.40	(.56 hr) 0.96
10. Fixed Cost Per Cwt.	(\$)	1.40	1.53	1.52	1.38
11. Total Production Costs	(\$)	5.49	5.94	6.03	5.41
Returns to:					
12. Unpaid Labour, Mgmt. & Invest.	(\$)	2.33	2.20	2.42	2.18
13. Unpaid Labour & Management	(\$)	1.56	1.31	1.54	1.41
14. Operator's Labour & Management	(\$)	1.49	1.16	1.37	1.37
15. Management & Risk	(\$)	0.97	0.42	0.52	0.92
16. Number of Cows	(no.)	50.0	42.0	36.3	55.5
17. Total Milk Production	(lbs.)	615,192	394,890	383,966	632,660
18. Production Per Cow	(lbs.)	12,272	9,585	10,582	11,388
19. Dairy Investment	(\$)	67,663	49,937	48,426	69,734
20. Capital Turnover	(yrs.)	1.70	1.99	1.92	1.74

^{1/} Productivity per cow, above or below the average of \$710, is the major factor identified with items in the first two columns.

^{2/} The labour time, above or below the average of .72 hours per hundredweight, is the controlling factor in the items in the third and fourth columns.

